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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,622	01/24/2002	Toshikazu Tachikawa	2002-0069	6163

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EXAMINER

ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 04/23/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/053,622

Applicant(s)

TACHIKAWA ET AL.

Examiner

Rosemary E. Ashton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on November 22, 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-15 is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al (U.S. patent no. 6,042,988) in view of JP 2-15270 cited on applicant's IDS.

Sato teaches a negative working photoresist composition comprising an alkali soluble polymer of polyhydroxystyrene with 1-45 mole % of the hydroxyl groups substituted with acid cleavable groups as in claim 1 and 3 with a t-butyl group which is a C4 alkyl group as in claim 4 (col. 4, lines 14-23 and col. 3, lines 54-55) or polyhydroxystyrene/styrene 85:15 as in claim 3 (example 1); a photoacid generator onium salt having a fluoromethyl sulfonate anion such as (t-butylphenyl)diphenyl sulfonium trifluoromethane sulfonate as in claims 1 and 2 (col. 4, lines 25-48); a crosslinking agent of a melamine or urea; an amine compound such as a tertiary amine as in claims 6 and 7 and an acid compound such as malonic acid or succinic acid as in claims 8 and 9 (col. 8, lines 58-67)); a solvent such as propylene glycol monomethyl ether acetate and propylene glycol monomethyl ether and mixtures thereof (col. 10, lines 4-20, lines 45-48). The amount of resin, PAG and crosslinker are in the range claimed by applicant in claim 1 (Sato claim 7).

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Sato does not teach the crosslinking agent has the structure in claim 1.

JP '270 teaches a photoresist composition comprising a resin of polyhydroxystyrene, PAG and crosslinking agent of a melamine or urea as claimed by applicant.

It would have been obvious to one of ordinary skill in the art to use the urea crosslinking agents such as the compounds in col. 13, line 12 and col. 14, line 1 in the invention of Sato with a reasonable expectation of obtaining a negative working photoresist because Sato teaches urea compounds may be used in the invention and JP'270 teaches the ethylene urea crosslinkers are equivalent to the melamine crosslinking agents exemplified in Sato.

As to any differences in amounts of reagents: it would have been obvious to one of ordinary skill in the art to vary the amount of reagents in the composition through routine experimentation so as to obtain a photoresist composition for pattern formation because optimization of reagent concentrations is well known in the art. As stated in section 2144.05(b) of the MPEP: "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA-1955).

11-15
3. Claims ~~11-19~~ are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of JP'270 cited above in further view of Rogers et al (U.S. patent no. 6,010,829).

As shown above the combination of Sato and JP'270 teaches applicant's photoresist composition. Sato teaches the standard photolithographic method using the composition comprising coating, exposure and developing. Sato does not teach using the composition with a bottom antireflective coating (BARC) and a top antireflective coating (TARC) as in claim 15.

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Rogers et al teaches coating multilayer photosensitive material for patterning a photoresist layer comprising a BARC, a photoresist layer and a TARC as in claims 12-16 (col. 2, lines 66-67 and col. 3, lines 1-24). Rogers teaches the thickness of the layers, such as 220 nm for the BARC as in claim 14, including the photoresist layer may be varied so as to obtain the desired etch pattern (col. 4, lines 56-67).

It would have been obvious to one of ordinary skill in the art to use the photoresist composition of Sato and JP'270 in a patterning method comprising a BARC and a TARC as taught in Rogers reasonable expectation of obtaining a photosensitive material for patterning a photoresist layer because Rogers teaches the multilayer material of BARC, photoresist and TARC provides a polysilicon substrate patterned using the layers so that linewidths below 0.35 microns are formed (abstract).

As to the water solubility of the BARC and TARC one of ordinary skill in the art knows how to optimize the reagents for the layers so as to obtain a successful resist pattern after exposure and development of the resist.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 308-2057. The examiner can normally be reached on 8 hour days.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Baxter can be reached on 308-2303. The fax phone numbers for the organization where this application or proceeding is assigned are 703 305 7718 for regular communications and 703 305 3599 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.



Rosemary E. Ashton
Examiner
Art Unit 1752

rea
April 18, 2003

**ROSEMARY ASHTON
PRIMARY EXAMINER**